References

1. Note that due to the annual loss and replacement of ambient monitoring sites (e.g., redevelopment, new leases), too few sites possess a monitoring record sufficient to construct a representative 20-year trend for the nation. Therefore, this report assesses long-term trends by piecing together two separate 10-year trends databases.

2. *Oxygenated Gasoline Implementation Guidelines*, EPA, Office of Mobile Sources, Washington, DC, July 27, 1992.

3. *Guidelines for Oxygenated Gasoline Credit Programs and Guidelines on Establishment of Control Periods Under Section 211(m) of the Clean Air Act as Amended*, 57 FR 47853 (October 20, 1992).

4. Table of winter oxygenated fuels programs by state, EPA, Office of Transportation and Air Quality, Washington, DC, December 8, 1999. **http://www.epa.gov/otaq/regs/fuels/oxy-area.pdf**

5. National Ambient Air Quality Standards for Nitrogen Dioxide: Final Decision, *Federal Register*, 61 FR 196, Washington, DC, October 8, 1996.

6. *Review of the National Ambient Air Quality Standards for Nitrogen Oxides: Assessment of Scientific and Technical Information,* EPA-452/R-95-005, U.S. Environmental Protection Agency, Research Triangle Park, NC, September 1995.

7. Atmospheric concentrations of NO_2 are determined by indirect photomultiplier measurement of the luminescence produced by a critical reaction of NO with ozone. The measurement of NO_2 is based first on the conversion of NO_2 to NO, and then subsequent detection of NO using this well-characterized chemiluminescence technique. This conversion is not specific for NO_2, hence chemiluminescence analyzers are subject to interferences produced by response to other nitrogen-containing compounds (e.g., peroxyacetyl nitrate [PAN]) that can be converted to NO. The chemiluminescence technique has been reported to overestimate NO_2 due to these interferences. This is not an issue for compliance because there are no violations of the NO_2 NAAQS. In addition, the interferences are believed to be relatively small in urban areas. The national and regional air quality trends depicted are based primarily on data from monitoring sites in urban locations and are expected to be reasonable representations of urban NO_2 trends. That is not the case in rural and remote areas, however, where air mass aging could foster greater relative levels of PAN and nitric acid and interfere significantly with the interpretation of NO_2 monitoring data.

8. *1998 Compliance Report*, U.S. Environmental Protection Agency, Acid Rain Program, Washington, DC, August 1999.

9. National Ambient Air Quality Standards for Ozone; Final Rule, *Federal Register*, 62 FR 38856, Washington, DC, July 18, 1997.

10. United States Environmental Protection Agency. Office of Air Quality Planning and Standards. 2000. "National Air Quality and Emissions Trends Reports, 1998." Appedix B.

11. The 1-hour annual ozone design value is defined at an individual monitoring location as the second highest daily maximum 1-hour average concentration; the 8-hour annual design value is definedas the fourth highest daily maximum 8-hour average concentration.

12. Coulter-Burke, S. and T. Stoeckenius, 2002. *Analysis of Ambient Air Quality Trends in the Chicago and Atlanta Ozone Nonattainment Areas.* ENVIRON International Corp., September.

13. CASTNet is considered the nation's primary source for atmospheric data to estimate dry acidic deposition and to provide data on rural ozone levels. Used in conjunction with other national monitoring networks, CASTNet helps to determine the effectiveness of national emission control programs. Established in 1987, CASTNet now comprises 79 monitoring stations across the United States. The longest data records are primarily at eastern sites. The majority of the monitoring stations are operated by EPA's Office of Air and Radiation; however, 27 stations are operated by the National Park Service (NPS) in cooperation with EPA. The CASTNet data complement the larger O_3 data sets gathered by the State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS) networks with additional rural coverage.

14. Similarly, although registering declines in 8-hour ozone levels of 16 and 12 percent, respectively, over the last 20 years, urban and suburban site progress slowed between 1991 and 2000 (to 8.5 and 8 percent improvement).

15. This analysis utilizes a nonparametric regression procedure to assess statistical significance, a description of which is provided in Chapter 3: Criteria Pollutants – Metropolitan Area Trends.

16. "Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1989 and Beyond," *Federal Register*, 54 FR 11868,